TRANSMITTAL OF APPEAL BRIEF			Docket No. DWH-11702/29
In re Application of: Dawn White et al.			
Application No. 10/629,285-Conf. #5710	Filing Date July 29, 2003	Examiner J. D. Sells	Group Art Unit 1734
Invention: ENGINEERED THERMAL MANAGEMENT DEVICES AND METHODS OF PRODUCING THE SAME			

TO THE COMMISSIONER OF PATENTS:

Transmitted herewith is the Appeal Brief in this application, with respect to the Notice of Appeal filed: September 26, 2007 .

The fee for filing this Appeal Brief is N/A .

☐ Large Entity ☒ Small Entity

☐ A petition for extension of time is also enclosed.

The fee for the extension of time is ______ .

☐ A check in the amount of ______ is enclosed.

☐ Charge the amount of the fee to Deposit Account No. ______ . This sheet is submitted in duplicate.

☐ Payment by credit card.

☐ The Director is hereby authorized to charge any additional fees that may be required or credit any overpayment to Deposit Account No. ______ . This sheet is submitted in duplicate.

/John G. Posa/ Dated: Sept. 26, 2007

John G. Posa
Attorney Reg. No.: 37,424
GIFFORD, KRASS, SPRINKLE, ANDERSON & CITKOWSKI, P.C.
2701 Troy Center Drive, Suite 330
Post Office Box 7021
Troy, Michigan 48007-7021
(734) 913-9300

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of: White et al.

Serial No.: 10/629,285 Group No.: 1734

Filed: July 29, 2003 Examiner: James Sells

For: ENGINEERED THERMAL MANAGEMENT DEVICES AND METHODS OF PRODUCING THE SAME

APPELLANT'S APPEAL BRIEF UNDER 37 CFR §41.37

Mail Stop Appeal Brief
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I. Real Party in Interest

The real parties and interests in this case are Dawn White and David Carmein, Applicants and Appellants.

II. Related Appeals and Interferences

There are no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

The present application was filed with 27 claims. Claims 1-27 are pending; however, claims 12-22 have been withdrawn from consideration. Claims 1-11 and 23-27 are rejected and under appeal. Claim 1 is the sole independent claim.

IV. Status of Amendments Filed Subsequent Final Rejection

No after-final amendments have been filed.

V. Summary of Claimed Subject Matter

Independent claim 1 is directed to a method of fabricating a thermal management device, comprising the steps of a) using a solid-state consolidation process to deposit a plurality of first material layers exhibiting a high degree of thermal conductivity, and b) separating the first material layers with a different, second material having a desired physical property. (Specification, page 4, line 12 to page 5, line 3; Figure 1A).

VI. Grounds of Rejection To Be Reviewed On Appeal

A. The rejection of claims 1-11 and 23-27 under 35 U.S.C. §112, second paragraph.

B. The rejection of claims 1-8 and 23-27 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,792,677 to Reddy et al. in view of U.S. Patent No. 6,103,392 to Dorfman et al.

C. The rejection of claims 9-11 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,792,677 to Reddy et al. in view of U.S. Patent No. 6,103,392 to Dorfman et al., and further in view of U.S. Patent No. 4,885,214 to Trenkler et al.

VII. Argument

A. The rejection of claims 1-11 and 23-27 under 35 U.S.C. §112, second paragraph.

Claims 1-11 and 23-27 stand rejected under 35 U.S.C. §112, second paragraph on the grounds that claim 1 sets forth "a high degree of thermal conductivity" and claim 2 recites "a high coefficient of thermal expansion." Appellant contends that such terms are well understood to those of skill in the art. Indeed, "[i]t is the Examiner's position that it is well known in the art that metals inherently have a relatively high degree of thermal conductivity." A high degree of thermal conductivity simply means that if the thermal conductivity all materials falls within a range (which has to be the case), then a high degree of thermal conductivity is nearer to the upper end of that range. The same holds true of "a high coefficient of thermal expansion."

B. Claims 1-8 and 23-27.

Claims 1-8 and 23-27 stand rejected under 35 USC 103(a) over Reddy ('677) in view of Dorfman ('392). Reddy resides in "the use of embedded metal planes as heat sinks to transfer heat from

electronic devices. These embedded metal planes, are useful when the power-generating electronic devices are mounted on the surface of an insulating substrate such as a plastic material. In one embodiment, thermal connection between the electronic devices and the embedded metal planes is established through thermally conductive vias." ('677 Patent, 2:17-24). "The metal planes are embedded in the substrate through insert molding or any other suitable process. During the insert molding process, it is thus preferred that the metal planes are placed in the mold during the molding process such that the insulating substrate is formed surrounding the metal planes." ('677 Patent, 6:62-67)

The Examiner concedes that "Reddy does not disclose the consolidation process as claimed by Applicant." (Final OA, p. 2) Despite Reddy's stated use of *insert molding or any other suitable process for embedding metal within plastic*, the Examiner argues that "[i]t would have been obvious to one having ordinary skill in the art to employ a solid-state consolidation process, as taught by Dorfman, in the method of Reddy "in order to fabricate the metal layers with desired shapes." In addition, without the disclosure of unexpected results, it is the Examiner's position that the specific materials and consolidation process claimed by the Appellants are within the purview of one having ordinary skill in the art and would have been obvious to employ in the method of Reddy as a matter of design choice based on the desired physical properties of the articles being manufactured."

These arguments are weak at best. First, regarding the motivation to "fabricate the metal layers with desired shapes," this is not any problem set forth by Reddy. Reddy can shape its metal layers in any shape desired, because they are simply metal plates that are embedded in plastic. Indeed, the plastic can be used to achieve the "desired shape," whatever that may be. Secondly, as discussed further below, the "Examiner's position" that "the specific materials and consolidation process claimed by the Appellants are within the purview of one having ordinary skill in the art" falls short of the requisite factual evidence for establishing *prima facie* obviousness.

On page 6 of the Latest Final OA, the Examiner argues that "if Applicant provides some evidence or convincing line of reasoning why the specific materials or components are unobvious or generate unexpected results, then the Examiner will withdraw the appropriate rejection." The Examiner has it backwards. In rejecting claims under 35 U.S.C. §103, *the Examiner bears the initial burden of presenting a* prima facie *case of obviousness*. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955,

1956 (Fed. Cir. 1993). A *prima facie* case of obviousness is established by presenting evidence that the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed combination or other modification. See In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

Furthermore, the conclusion that the claimed subject matter is *prima facie* obvious must be supported by evidence, as shown by some objective teaching in the prior art or by knowledge generally available to one of ordinary skill in the art that would have led that individual to combine the relevant teachings of the references to arrive at the claimed invention. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Rejections based on §103 must rest on a factual basis with these facts being interpreted without hindsight reconstruction of the invention from the prior art. The Examiner may not, because of doubt that the invention is patentable, resort to speculation, unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis for the rejection. See In re Warner, 379 F.2d 1011,1017,154 USPQ 173, 177 (CCPA 1967), cert. denied, 389U.S. 1057 (1968).

When determining obviousness, "the [E]xaminer can satisfy the burden of showing obviousness of the combination 'only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.'" In re Lee, 277 F.3d 1338, 1343, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002), citing In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992). "Broad conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence.'" In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). "Mere denials and conclusory statements, however, are not sufficient to establish a genuine issue of material fact." Dembiczak, 175 F.3d at 999-1000, 50 USPQ2d at 1617, citing McElmurry v. Arkansas Power & Light Co., 995 F.2d 1576, 1578, 27 USPQ2d 1129, 1131 (Fed. Cir. 1993).

In this case, the Examiner offers only conclusory statements, which are not sufficient to establish *prima facie* obviousness. The only prior-art passage to which the Examiner refers is Dorfman at col. 1, lines 46-51, and col. 3, lines 4-26, which read as follows:

> "Prior art methods directed to improving the homogeneity of W—Cu composite powders by coating tungsten particles with copper have not been successful as these

copper-coated powders still exhibit a high tendency towards copper bleedout during the consolidation of the composite powder into fabricated shapes."

"Several factors influence the solid-state (below 1083°C. —the melting point of copper) and liquid-phase (above the melting point of copper) sintering behavior of submicron W—Cu powder systems. Compacted refractory metal powders undergo considerable microstructural changes and shrinkage during solid-state sintering (in the absence of liquid phase). Submicron particle size powders effectively recrystallize and sinter at temperatures (T) which are much lower than the melting temperatures (T_m) of refractory metals ($T \cong 0.3\ T_m$) The initial sintering temperature for submicron (0.09-0.16 μm) tungsten powder is in the range of 900-1000°C. The spreading of copper and the formation of a monolayer copper coating on tungsten particles occurs in the temperature range of 1000-1083°C. By lowering the activation energy for tungsten diffusion, monolayer copper coatings activate the solid-state sintering of tungsten. Therefore, a number of complementary conditions are met for bonding submicron tungsten particles into a rigid tungsten framework within the composite powder compact during solid-state sintering (950-1080°C.). High fineness and homogeneity of the starting composite powders are expected to enhance the sintering of a structurally homogeneous tungsten framework. Such framework should, in turn, aid in making a homogeneous pseudoalloy."

These passages appear to Appellants to be unrelated to the pending claims. Although the first passage mentions "fabricated shapes," no mention is made "solid-state consolidation," "layers," or any other meaningful teaching. The second passage is limited to the sintering behavior of submicron W-Cu powder systems. The reference to a "framework" is non-analogous. If the Examiner feels this passage is relevant because instant claim 4 sets forth copper, Appellants respectfully counters that the Examiner is misguided.

In summary, it is impossible for Appellants to adequately respond to this Office Action because only "the Examiner's position" is used as the basis for rejection. A plurality of claims should never be grouped together in a common rejection, unless that rejection is equally applicable to all claims in the group. MPEP 707.07(d). Appellants respectfully request comprehensive examination of all claims on the merits, allowance or both.

C. <u>Claims 9-11.</u>

Claims 9-11 stand rejected under 35 U.S.C. §103(a) over the Reddy/Dorfman combination, and further in view of Trenkler ('214). Claim 9 resides in an ultrasonic consolidation process; claim 10

resides in electrical resistance consolidation process; and claim 11 sets forth a frictional consolidation process.

The Trenkler reference discloses a method of making a composite material wherein portions of a first material such as a metal or ceramic having coatings of a metal material thereon are disposed in a metal matrix material. Diffusion bonds between the coating and matrix material secure the portions of the first material at selected locations in the composite material. ('214 Patent, Abstract).

Appellant's claim 9 *adds to claim 1* that the solid-state consolidation process is an ultrasonic consolidation process. This means that an ultrasonic consolidation process is used *to deposit a plurality of first material layers* exhibiting a high degree of thermal conductivity. Appellant's claim 10 *adds to claim 1* that the solid-state consolidation process is an electrical resistance consolidation process. This means that an electrical resistance consolidation process is used *to deposit a plurality of first material layers* exhibiting a high degree of thermal conductivity. Appellant's claim 9 *adds to claim 1* that the solid-state consolidation process is a frictional consolidation process. This means that a frictional consolidation process is used *to deposit a plurality of first material layers* exhibiting a high degree of thermal conductivity.

Just because Trenkler states that "[t]he energy needed to produce the reaction forming the compound may be injected in the form of ultrasonic vibration, inductive heating, explosive shock, magnetic excitation or the like" ('214 Patent, 2:40-44) does not mean that Trenkler teaches or even suggests an ultrasonic, resistance, or frictional consolidation process, particularly in view of Appellant's disclosure. Moreover, Trenkler certainly does not suggest how such consolidation processes may be used *to deposit layers*. Accordingly, even if the Reddy/Dorfman/Trenkler combination were proposed, not all of Appellant's claim limitations would result, thereby defeating *prima facie* obviousness.

The Examiner's argument is that it would have been obvious to employ the technique of Trenkler "in order to facilitate bonding of the materials." This is not persuasive. The prior art *already teaches* bonding of materials, such that the importation of the entirely different process is redundant and without foundation.

The Examiner's further contention that although Trenkler does not teach electrical resistance or friction solid-state consolidation processes, it would have been obvious "to employ in the above-described method since they are functionally equivalent alternate expedients in the art." Again, *prima*

facie obviousness requires some teaching or suggestion from the prior art in support of a rejection; otherwise, the opinion constitutes mere speculation and improper hindsight.

Conclusion

In conclusion, for the arguments of record and the reasons set forth above, all pending claims of the subject application continue to be in condition for allowance and Appellant seeks the Board's concurrence at this time.

Respectfully submitted,

By:____________________

Date: Sept. 26, 2007

John G. Posa
Reg. No. 37,424
Gifford, Krass, Sprinkle, Anderson &
Citkowski, P.C.
PO Box 7021
Troy, MI 48007-7021
(734) 913-9300

APPENDIX A

CLAIMS ON APPEAL

1. A method of fabricating a thermal management device, comprising the steps of:

a) using a solid-state consolidation process to deposit a plurality of first material layers exhibiting a high degree of thermal conductivity; and

b) separating the first material layers with a different, second material having a desired physical property.

2. The method of claim 1, wherein the desired physical property is a high coefficient of thermal expansion.

3. The method of claim 1, wherein the second material is air.

4. The method of claim 1, wherein the first material is copper.

5. The method of claim 1, wherein the first material is aluminum.

6. The method of claim 1, wherein the first material is in the form of a mesh or screen.

7. The method of claim 1, wherein the second material is molybdenum.

8. The method of claim 1, wherein the second material is an iron-nickel-cobalt alloy.

9. The method of claim 1, wherein the solid-state consolidation process is an ultrasonic consolidation process.

10. The method of claim 1, wherein the solid-state consolidation process includes electrical resistance consolidation.

11. The method of claim 1, wherein the solid-state consolidation process includes frictional consolidation.

23. The method of claim 1, wherein the material layers form a cooling channel.

24. The method of claim 1, furthering including the addition of wicking material.

25. The method of claim 1, furthering including the step of embedding a sensor into the device.

26. The method of claim 1, furthering including the step of embedding a fan, heat pump, or other active device to increase heat dissipation rate into the device.

27. The method of claim 1, wherein the material layers form a thermal bus.

APPENDIX B

EVIDENCE

None.

APPENDIX C

RELATED PROCEEDINGS

None.